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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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EXAMINER

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ART UNIT

PAPER NUMBER

2834

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.
09/456,184

Applicant
Okada

Examiner
Thomas M. Dougherty

Group Art Unit
2834



☒ Responsive to communication(s) filed on Mar 2, 2001

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 1-26 is/are pending in the application.

Of the above, claim(s) 7-16 is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1-6 and 17-26 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☒ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☒ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____.

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☐ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 3

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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DETAILED ACTION

Election/Restriction

Response to Arguments

1. Applicant's arguments concerning the restriction requirement filed 3/2/01 have been fully considered but they are not persuasive. The restriction is maintained for the reasons cited in paper no. 6.

2. ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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4. Claims 1, 2, 6, 17, 18, 23 and 24 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Okazaki (US 5,783,899). Okazaki shows (fig. 3) a driving apparatus for driving a piezoelectric device (11a) serving as a driving source of an actuator comprising: a waveform generator (e.g. 24) for generating a signal varying corresponding to passage of time; a first driver (inherently within 24) for generating a first voltage signal having a maximum voltage smaller than a voltage of inversion of polarization of the piezoelectric device by using the signal from the waveform generator (24), note that this is necessary or else the device will be able to do useful work, and for applying the first voltage signal to the piezoelectric device (11a) in the polarization direction; and a second driver (within 24) for generating a second voltage signal having a maximum voltage smaller than the voltage of inversion of polarization of the piezoelectric device (11a) and the same polarity as that of the first driving signal by using the signal from the waveform generator (24), and for applying the second voltage signal to the piezoelectric device (11) in a direction opposite to the polarization direction (by means of the polarity inverter, 25). The second driving signal has a waveform which is an inversion of a waveform of the first driving signal. The actuator is an impact type actuator comprising a first unit (11) with the piezoelectric device and a second unit (16) slidable held on and relatively movable against the first unit (see col. 4, lines 41-43). The driving apparatus further comprising a[n] electric power supply for supplying electric power to the first and second drivers (inherent or there could be no output from 24).

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5. Claims 1-3, 5, 17, 18 and 23-25 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Myohga et al. (US 5,319,278). Myohga shows (fig. 2) a driving apparatus for

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driving a piezoelectric device (20) serving as a driving source of an actuator comprising: a waveform generator (50) for generating a signal varying corresponding to passage of time; a first driver (51) for generating a first voltage signal having a maximum voltage smaller than a voltage of inversion of polarization of the piezoelectric device by using the signal from the waveform generator (50), note that this is necessary or else the device will be able to do useful work, and for applying the first voltage signal to the piezoelectric device (20) in the polarization direction; and a second driver (52) for generating a second voltage signal having a maximum voltage smaller than the voltage of inversion of polarization of the piezoelectric device (20) and the same polarity as that of the first driving signal by using the signal from the waveform generator (50), and for applying the second voltage signal to the piezoelectric device (20) in a direction opposite to the polarization direction (col. 3, ll. 8-10). The second driving signal has a waveform which is an inversion of a waveform of the first driving signal (inherent in a 180 degree phase shift). The waveform of the first and second driving signals are a sine wave (col. 2, ll. 67-68). The first driver (51) and the second driver (52) respectively includes an amplifier (51 or 52) for amplifying the signal from the waveform generator (50). The driving apparatus further comprising a[n] electric power supply for supplying electric power to the first and second drivers (inherent or there could be no output from 50).

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6. *Claim Rejections - 35 USC § 103*

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 4 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over either Okazaki (US 5,783,899) or Myohga et al. (US 5,319,278) in view of Nakano (US 5,969,464).

Given the invention of Okazaki as noted above, he doesn't show the waveform of the first and second driving signals as being a sawtooth wave in which the inclination in a rising up portion is different from that in a falling down portion. Nakano shows (fig. 6) a driving apparatus for driving a piezoelectric device (28) serving as a driving source of an actuator comprising: a waveform generator (21) for generating a signal varying corresponding to passage of time; a first driver (23) for generating a first voltage signal having a maximum voltage smaller than a voltage of inversion of polarization of the piezoelectric device by using the signal from the waveform generator (24), note that this is necessary or else the device will be able to do useful work, and for applying the first voltage signal to the piezoelectric device (28) in the polarization direction. He further shows use of a waveform of the first driving signal as being a sawtooth wave in which the inclination in a rising up portion is different from that in a falling down portion. He doesn't show a second driver in that figure. It would have been obvious to employ a waveform of the first and

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second driving signals as being a sawtooth wave in which the inclination in a rising up portion is different from that in a falling down portion as such a driving signal is taught by Nakano since this is a well-known driving method in the art and allows for precise placement of a component.

9. Claims 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okazaki (US 5,783,899) in view of Naito (US 5,210,454). Given the invention of Okazaki as noted above, Okazaki does not explicitly show amplifiers as drivers. Naito shows (fig. 1) a driving apparatus for driving a piezoelectric device (4) serving as a driving source of an actuator comprising: a waveform generator (1) for generating a signal varying corresponding to passage of time; a first driver (3) for generating a first voltage signal having a maximum voltage smaller than a voltage of inversion of polarization of the piezoelectric device by using the signal from the waveform generator (1), note that this is necessary or else the device will be able to do useful work, and for applying the first voltage signal to the piezoelectric device (4) in the polarization direction; and a second driver (8) for generating a second voltage signal having a maximum voltage smaller than the voltage of inversion of polarization of the piezoelectric device (4) and the same polarity as that of the first driving signal by using the signal from the waveform generator (1), and for applying the second voltage signal to the piezoelectric device (4). His second signal is not in a direction opposite to the polarization direction. It would have been obvious to one having ordinary skill in the art to employ an amplifier for supply of a drive signal to the device of Okazaki such as is shown by Naito in order to provide a suitable voltage level to the motor, thereby allowing it to be effectively driven.

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10. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okazaki (US 5,783,899). Given Okazaki's invention, he doesn't show the ability to apply voltages corresponding to the waveform of the signal when the signal from the waveform generator is smaller than the predetermined level or to limit the output voltages to 0V when the signal from the waveform generator is equal to the predetermined level. These are however regarded as goals of the invention as no structure is claimed which allows any such judgements to occur. In other words this is a functional recitation without any supporting structure.

11. Claims 3 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okazaki (US 5,783,899) in view of Myohga et al. (US 5,319,278). Given the inventions of Okazaki and Myohga as noted above, Okazaki doesn't note specific use of a sine wave output from his first waveform generator (24). It would have been obvious to one of ordinary skill in the art to employ a sine wave output from the waveform generator of Okazaki at the time of his invention such as is shown by Myohga, because this is a well-known signal type for driving piezoelectric devices, as such, its employment involves no inventive step.

12. Claims 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Myohga (US 5,319,278). Given Myohga's invention, he doesn't show the ability to apply voltages corresponding to the waveform of the signal when the signal from the waveform generator is smaller than the predetermined level or to limit the output voltages to 0V when the signal from the waveform generator is equal to the predetermined level. These are however regarded as goals

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of the invention as no structure is claimed which allows any such judgements to occur. In other words this is a functional recitation without any supporting structure.

13. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over either of Okazaki (US 5,783,899) or Myohga et al. (US 5,319,278) in view of Nakano (US 5,969,464). Given the inventions of Okazaki and Myohga as noted above, neither shows the waveform of the first and second driving signals as being a sawtooth wave in which the inclination in a rising up portion is different from that in a falling down portion. Nakano shows (fig. 6) a driving apparatus for driving a piezoelectric device (28) serving as a driving source of an actuator comprising: a waveform generator (21) for generating a signal varying corresponding to passage of time; a first driver (23) for generating a first voltage signal having a maximum voltage smaller than a voltage of inversion of polarization of the piezoelectric device by using the signal from the waveform generator (24), note that this is necessary or else the device will be able to do useful work, and for applying the first voltage signal to the piezoelectric device (28) in the polarization direction. He further shows use of a waveform of the first driving signal as being a sawtooth wave in which the inclination in a rising up portion is different from that in a falling down portion. He doesn't show a second driver in that figure. It would have been obvious to employ a waveform of the first and second driving signals as being a sawtooth wave in which the inclination in a rising up portion is different from that in a falling down portion as such a driving signal is taught by Nakano since this is a well-known driving method in the art and allows for precise placement of a component.

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14.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The remaining prior art cited reads on some aspects of the claimed invention.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas M. Dougherty whose telephone number is (703) 308-1628.

TMD
TMD

March 14, 2001

Thomas M. Dougherty
THOMAS M. DOUGHERTY
PRIMARY EXAMINER
GROUP 2100
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